In Re Patent Application of Tobias Melz et al
Application No.: 10/565,469
Filed: January 19, 2006
For: MODULAR INTERFACE FOR DAMPING MECHANICAL VIBRATIONS

Attn: Examiner XUAN LAN T NGUYEN <lan.nguyen@uspto.gov>

INTRODUCTION

The following remarks and explanations are submitted in response to the invitation of Examiner Nguyen to further explain Applicants' position with respect to the cited Prior Art. In order to expedite prosecution of this application, permission is hereby granted to the Examiner to communicate with the undersigned by email at cash@ipxlaw.com

REMARKS

Applicant discloses in FIG. 2 (inserted below) an embodiment of the claimed Interface for use in a vibration damping system. The interface includes:

a base connection element 10 in the form of a circular disk;

a support element 14 in the form of an annular disk;

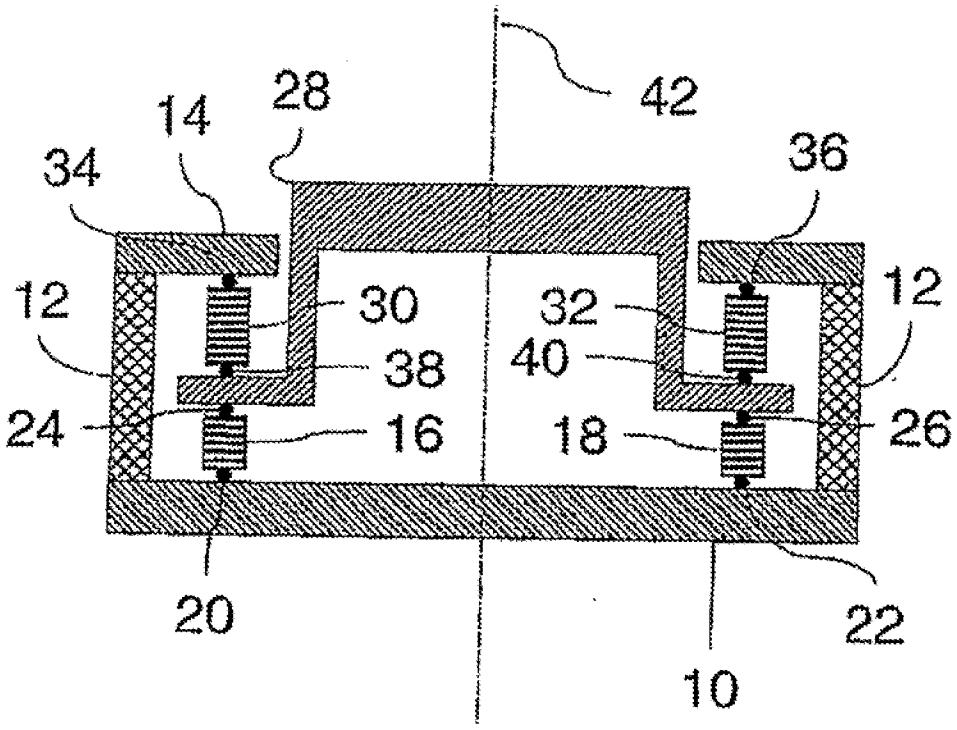
an elastic, pipe-shaped pretensioning device 12 having one end connected to the support element 14, and its other end connected to the base connection element 10;

a hat or cap shaped (page 11, line 5) load connection element 28 disposed within and extending out of the chamber formed by the base connection element 10, the pipe-shaped pretensioning device 12 and the annular disk-shaped support element 14;

a first energy converter system composed of piezoactuators 16 and 18 that extend between the engagement points 20 and 22 on the base connection element 10 and the engagement points 24 and 26 on the load connection element 28; and

a second energy converter system composed of piezoactuators 30 and 32 that extend between the engagement points 34 and 36 on the support element 14 and the engagement points 38 and 40 on the load connection element 28.

Application Fig.2 (below)



As pointed out in the specification on page 11 beginning in line 7:

> "…The pretensioning device 12 is composed of an elastic pipe with a diameter which is identical to the external diameter of the circular disk of the base connection element 10 and to the external diameter of the annular disk of the support element 14. The pretensioning is carried out by virtue of the fact that the (axial) length of the elastic pipe is selected such that the pipe is expanded in the state of rest of the arrangement. As a result compressive pretensioning is exerted simultaneously on all the piezoactuators."

By inspection of Fig. 2, it is apparent that if the elastic pipe 12 is "expanded in the state of rest of the arrangement", then something must be holding it in its expanded state; clearly this must be the piezoactuators 16 and 30, and 18 and 32 which are thus subjected to compression by the pretensioning device (the elastic pipe) 12.

This relationship is further supported by Applicants earlier assertion in page 4 of the specification, beginning at line 21, that

> "The base connection element is connected to the at least one support element via at least one pretensioning device in such a way that the pretensioning device can exert a preload on the first energy converter system and on the second energy converter system."

There can thus be no doubt that when Applicants submitted the original claim 10, the recitations in subparagraphs (c) and (c1), viz.,

> "…c) wherein the base connection element is connected to the at least one support element by means of at least one elastic pretensioning device in such a way that the elastic pretensioning device can exert a preload on the first energy converter system and on the second energy converter system;
>
> c1) wherein the pretensioning device is embodied as an elastic pipe which surrounds the actuator systems; …"

and subsequently amended the recitations to read

> "…c) wherein the base connection element is connected to the at least one support element by means of at least one elastic pretensioning device ~~in such a way that the elastic pretensioning device can exert~~ for exerting a preload on the first energy converter system and on the second energy converter system;
>
> c1) wherein the pretensioning device is embodied as an elastic pipe which surrounds the energy converter ~~actuator~~ systems; …"

the intent was to claim an interface in which a pretentioning device was provided to apply a compressive preload force to the piezoactuators or other energy converter systems.

In an attempt to further clarify the recitation after the Final Rejection, Applicants sought to finally amend the claim to read

> "…c) wherein the base connection element is connected to the at least one support element by means of at least one elastic pretensioning device for exerting a compressive preload on the first energy converter system and on the second energy converter system;
>
> c1) wherein the pretensioning device is embodied as an elastic pipe which surrounds ~~the~~ said first and second energy converter systems; …"

This proposed amendment was not entered.

The Final Rejection

The claims were finally rejected under 35 U.S.C. 103(a) as unpatentable over Katsumi in view of Sasaki et al with the Examiner pointing out that Katsumi fails to disclose Applicant's elastic pretensioning device surrounding the recited actuators.

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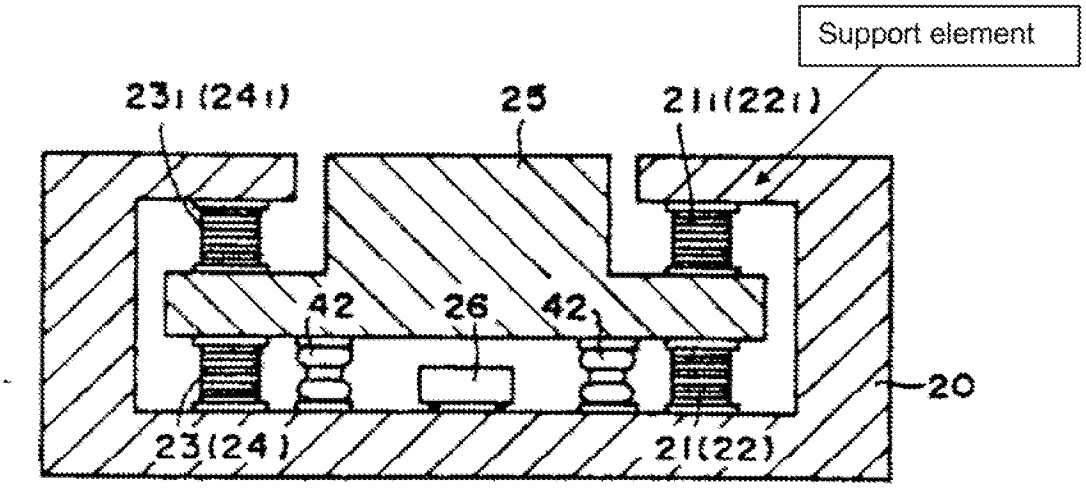


Katsumi discloses a relevant vibration suppressing apparatus including a load connection element 25 captured within a rigid support structure 20 and suspended therefrom by a plurality of piezoelectric elements 21-24.

As was correctly pointed out in the Office Action "Katsumi lacks the elastic pipe surrounding the actuators as claimed". However, it must be kept in mind that Applicants' claims do not merely recite "an elastic pipe" 12, and in fact recite "an elastic pretensioning device that is embodied as an elastic pipe which surrounds the energy converter systems". In fact, not only does the elastic pipe surround the energy converter systems, it also (1) connects the recited support element 14 to the recited base element 10, and (2) exerts, or applies, a preload on the first and second energy converter systems (the actuators 16, 18 and 3, 32). Katsumi clearly does not suggest the application of a preload to his actuator elements.

The Examiner asserted in the Office Actions that since Sasaki et al shows an elastic pipe 14 for a vibration damper in their Fig. 1, it would be obvious to modify Katsumi's assembly "to provide further damping capability".

FIG.1

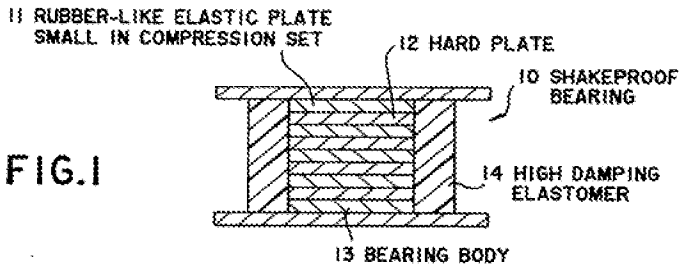
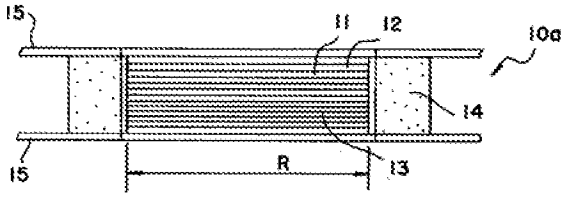


FIG.2



As indicated in Figs. 1 and 2 of the reference, Sasaki et al do not show, suggest or even relate to a vibration damping apparatus of the type disclosed by Applicants and Katsumi.

Sasaki et al disclose a shake-proof bearing assembly for supporting large building super-structures and allowing them to slide and or move vertically in the event of an earthquake. The bearing assembly (10) comprises a columnar bearing body (13) and a surrounding high damping elastomer (14). The bearing body (13) includes a stack of rigid plates (12) and elastic plates (11) alternating with one another. The high damping elastomer (14) may be shaped into an annular cylinder or, alternatively, may be in the form of a columnar stack of alternating annular rigid plates (18) and annular high-damping-elastomer plates (17).

The assembly does not include any "actuators" or "energy converter systems" as are included in Applicants' and Katsumi's apparatus. In the use of Sasaki's apparatus a supported building rests directly on the top of a compressible bearing body 13, and the bottom of the bearing body rests directly on the base.

In contrast, Applicants' corresponding "bearing body" 28 is supported above the base by piezoactuators 16 and 18. Similarly, Katsumi's corresponding "bearing body" 25 is supported above the base by piezo-electric elements 21, 22 and 23, 24.

Furthermore, in use, a supported building also rests above the top of Sasaki's surrounding elastomer 14, and the elastomer is not, but can be, compressed thereby against the base in the event of an earthquake.

In contrast, a downward vertical load carried by the corresponding "bearing bodies" elements of Applicants' apparatus, and that of Katsumi, is not carried by either Applicants' elastic pretensioning component 12 or the vertical walls of Katsumi's rigid support structure 20.

The shake-proof bearing assembly of Sasaki et al is thus non-analogous to and does not relate to a vibration reduction system of the type disclosed by either Applicants or Katsumi, i.e., the Sasaki apparatus is not a device for actively countering or suppressing vibrations that would otherwise be transmitted through a support structure to vibration sensitive machinery or electronic apparatus, it is a resilient support structure. It is only the remote similarity of the drawings that make the disclosure appear relevant to the present invention.

The bearing assembly of Sasaki et al is a passive support device for large building structures. The outer sleeve 14 (14a) of Sasaki is merely an additional flexible load resisting support element that is positioned around a central or main support element to be resiliently compressed by and further resist vertical loads of the type applied to a building during earth movement. The outer sleeve does not, nor is it intended to, apply any preload on the main support elements 11, 12. In fact, as pointed out in column 5, lines 17 and 18 of the Sasaki patent, the outer sleeve need not even be attached to the base plate or load bearing plate.

The Examiner has cited the recitation in col.2; lines 48-55 of the Sasaki reference, viz.,

> "The high damping elastomer in the shakeproof bearing of the invention is disposed on the outer circumference of the bearing body subjected to vertical load, and is free to bulge out to the deformation stress due to external force when struck by an earthquake. Accordingly, it is free from vertical load, and creep is not generated, and hence the life is long."

as stating that "the elastomer is free from vertical load when it is bulge(SIC) out due to external force from an earth quake." Applicants respectfully submit that this is not an accurate reading of Sasaki's statement. What Sasaki is saying is that the elastomer is disposed outside the bearing body and is free to bulge out due to an increased vertical load caused by an earthquake. The next sentence indicates that prior to such earthquake load, the elastic body is free from vertical load and thus not subject to "creep", and hence its useful life is long. The Examine then goes on to argue that "It does not mean that the elastomer is not pretensioned as concluded by Applicants. In fact it means the opposite." It is thus obvious that the Examiner's statement that "Since the elastomer is free from vertical load when it bulges out, it means that when the elastomer is straight, it is pretensioned" is patently incorrect.

Applicants' respectfully submit that the Examiner has inadvertently misinterpreted the Sasaki recitation, which is in fact contrary to such interpretation and states

that "The high damping elastomer… is free to bulge out to (SIC) the deformation stress due to external force when struck by an earthquake", and not that "the elastomer is free from vertical load when it bulges out" as alleged by the Examiner.

Furthermore, the Examiner again misinterprets Sasaki's statement in column 3, lines 35-39. Sasaki does not state that "the elastic plate 11 is in compression and that the level of compression can be adjusted by adjusting the elastomer 14." To the contrary, what Sasaki rather inartfully states in the referenced recitation is that

> "If the damping capacity of the rubber-like elastic plate 11 low in compression set is high or low, it may be adjusted by varying the quantity or performance of the externally mounted high damping elastomer 14."

Clearly, the phrase "low in compression set" should have been set out in commas. But in any case, Sasaki was obviously talking about the damping capacity of the elastic plates 11 (see Fig. 2) in the bearing body being high or low, and not suggesting that the elastomer 14 is in compression. The term "compression set" refers to the ability of a compressed elastic material to return to its natural state after having been compressed. See for example the following sentence, viz,

> "As the rubber-like elastic body 11 low in compression set such as natural rubber, it means an elastomer of which compression set is 25% or less."

Accordingly, the Examiner's conclusion that "elastomer 14 is pretensioned in order to compress the elastomer 11" is totally unsupported and must be withdrawn because Sasaki clearly neither discloses nor suggests "that the elastic tube14 is pretensioned in the same way as claimed by Applicants." It is thus clear that there is no basis for a combination of the teachings of Katsumi and Sasaki et al as grounds for rejection of any of Applicants' claims.

Reconsideration of the rejection and an early notice of allowance is therefore respectfully requested. It is suggested that upon withdrawing the rejection, it would be appropriate for the Examiner to amend the claims by Examiner's amendment to reflect the amendments presented after Final and pass the application to issue. In the event that the Examiner should remain adamant in maintaining the rejection, Applicants respectfully request the courtesy of an immediate notice thereof so that a Notice of Appeal can be timely filed.

Respectfully submitted;

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